ON THE PSYCHROLUTIDÆ OF GÜNTHER.

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(With Plate XLI.)

HISTORICAL.

In 1861 Dr. Albert Günther, in the third volume of his "Catalogue of the Acanthopterygian Fishes in the collection of the British Museum" (p. 516), proposed a family *Psychrolutidæ* in the following terms:

"Body rather elongate, naked; head large. Teeth small. A single dorsal fin on the tail, without spinous portion; anal similarly developed as the dorsal; ventrals close together, thoracic, composed of a few rays. Three gills and a half; pseudobranchiæ well developed. Gill-opening of moderate width, the gill-membranes attached to the isthmus.

"West coast of North America.

"The new fish for which I have created this family exhibits several characters indicating its natural affinity to the *Discoboli* and *Gobiesoces*, which are Acanthopterygians as this Order is understood at present. It is impossible, however, to refer it to one of these or of the other families without giving up the chief characters on which they are founded. It agrees—

"1, With *Blenniidæ* in the structure of the ventral fins, but is distinguished by the position of these fins and by the total absence of the spinous dorsal.

"2, With the *Discoboli*, and especially with *Liparis* in the structure of the infraorbital bone, in the integuments of the body, &c., but differs from them in the dorsal and ventral fins.

"3, With the *Gobiesoces* in the structure of the dorsal fin, but having no adhesive apparatus.

"4, It differs from the *Batrachidæ* and *Pediculati* in the dorsal and ventral fins, in the gill apparatus, &c.

"1. PSYCHROLUTES.

"Characters the same as of the family."

In the same volume Dr. Günther, in a "systematic synopsis of the families of the Acanthopterygian fishes" (p. ix), exhibited the relations of the fishes, supposed to exist at that time, in the following scheme:

Fourteenth division, *Acanth. gobiesociformes.*

No spinous dorsal; the soft and the anal short, or of moderate length, situated on the tail; ventral fins subjugular, $\frac{1}{5(4)}$, with an adhesive apparatus between them, or entirely absent. Body naked.

I. An adhesive apparatus between the ventrals.

42. Gobiesocidæ, III, p. 489.

II. Ventrals none.

43. Psychrolutidæ, III, p. 516.

The family and genus thus indicated were established for a single small fish, named *Psychrolutes paradoxus*, twenty-one lines in total length, obtained in the Gulf of Georgia during the voyage of H. M. S. *Plumper*.

In 1876 Captain Hutton, in the "Transactions and Proceedings of the New Zealand Institute" (Vol. VIII, p. 214), described a fish then recently found at New Zealand as *Psychrolutes latus*, considering it to be generically related to the North American fish.

In 1876 Dr. Albert Günther, in "The Annals and Magazine of Natural History" (4), Vol. XVII, p. 395, established for the New Zealand fish a peculiar genus, to which he gave the name *Neophrynichthys*, and assigned the following characteristics:

"Head broad and depressed; skin naked. Canine teeth none; palate smooth. Gill-covers without spines. Two dorsals, the first formed by nine flexible spines. Ventrals close together, thoracic, rudimentary. Three gills and a half; pseudo-branchiæ. Gill-opening extending to the lower angle of the pectoral."

On this form he commented as follows:

"One specimen 6½ inches long, from Dunedin, obtained from the Otago Museum. This fish has been named by Captain Hutton *Psychrolutes latus;* and from a careful comparison with *Psychrolutes paradoxus*, I can confirm the correctness of his view as regards the affinity of these two fishes; but the presence of a well-developed first dorsal appears to me to demand the separation of the New-Zealand fish into a distinct genus. The discovery of this fish led me to reconsider the position which the family Psychrolutidæ ought to take in the system. As the absence of the first dorsal can not be retained as one of the characters of the family (which would connect it with the Gobiesocidæ) I think those fishes ought to be removed from the division of *Gobiesociformes* to that of the *Cotto-scombriformes*, where it would follow the Batrachidæ."

He corrected the reference of the Psychrolutidæ to the Gobiesociformes in a foot-note (p. 396), as follows:

"In my systematic synopsis of the families of Acanthopterygian fishes a misleading error has crept in (p. ix), the family Psychrolutidæ being characterized by 'Ventrals none' instead of 'No adhesive ventral apparatus.' Also the diagnosis of the fourteenth division should be corrected by striking out the words 'or entirely absent.'"

Dr. Günther, in 1881, in the "Proceedings of the Scientific Meetings of the Zoological Society of London" for the year 1881 (p. 20, pl. 1), noticed and published a plate of a fish obtained in Swallow Bay, Magellan's Strait, which he referred to *Neophrynichthys latus* in the following terms:

"Of this very interesting fish, which was discovered only a few years ago by Mr. Hutton in New-Zealand, a specimen 16 inches long is in the collection. Fortunately, by the kindness of Mr. Hutton, I am in a position to compare the American specimen with the one obtained on the

New-Zealand coast. Structurally they are identical; only some tentacles are developed in the American specimen above the eye and on some parts of the body. The coloration is a blackish-brown, marbled with lighter brown and gray. These differences are not sufficient to indicate specific distinctness. The specimen was obtained in Swallow Bay, Magellan's Straits."

Finally Dr. Günther, in 1880, in his "Introduction to the Study of Fishes," (p. 469), interpolated the family Psychrolutidæ between the families Batrachidæ and Pediculati.

In 1882, Professors Jordan and Gilbert, in their "Synopsis of the Fishes of North America" (pp. 683, 686), identified a fish from Kodiak, Alaska, with the *Psychrolutes paradoxus*, and gave their views as to the relationships of the genus, differing entirely from Dr. Günther as to such relationships. They considered the genus *Psychrolutes* to be composed of "small fishes, closely resembling *Liparididæ*, from which group they are distinguished by no character of much importance," and referred the genus to the family Cottidæ, associating it with the genus *Cottunculus* in a subfamily Psychrolutinæ, which they proposed for the Cottidæ with "ventral fins present, spinous dorsal little developed, continuous with the soft dorsal, the spines slender, concealed in the loose, naked skin, gill-membranes loosely joined to the isthmus, no slit behind last gill" (p. 683).

Professors Jordan and Gilbert have specifically attributed to *Psychrolutes* a "suborbital stay narrow, not reaching preopercle."

If the identification of Professors Jordan and Gilbert had been correct, the material would now be at hand for a comparison of the genera *Psychrolutes* and *Neophrynichthys*, but if the description of Dr. Günther is reliable, the identification has been erroneous. (1) The spinous dorsal was externally invisible in the type so that it was denied, in the diagnostic phrase, "a single dorsal fin on the tail, without spinous portion," whereas, in the specimen of Jordan and Gilbert, the spinous dorsal is conspicuous, although covered by skin; (2) the eye in the type has a diameter only "about one-seventh of the length of the head, one-half of that of the snout," while the eye in the Kodiak fish is about one-fourth the length of the head and about equal to that of the snout; (3) the ventrals in the type are "composed of two rays, the inner of which is bifid," while the Kodiak fish has, apparently, a spine and five rays. The Alakan fish is in poor condition, and it does not seem advisable to allocate it until the typical *Psychrolutes* is re-examined. But, although the fishes described under the same name by Günther and Jordan and Gilbert appear to be distinct,* they may be allied, and the specimen described by the latter may thus be made serviceable in the inquiry as to the relations of the type.

*Dr. Bean informs me that he has himself distrusted the identification of the specimen described by Jordan and Gilbert, now in his custody, with the *Psychrolutes paradoxus*.

Several questions remain to be determined with respect to the representatives of the fishes thus noticed: (1) What are the relations of the respective genera? (2) What are their characteristics? (3) Are the fishes of New Zealand and South America the same? The possession by the National Museum of the specimen described by Jordan and Gilbert as *Psychrolutes paradoxus* and an authentic one of *Neophrynichthys latus* permit a comparison of the two types, but, being unique to the Museum, the rules do not permit their dissection. The questions can therefore be in part, and only in part, elucidated.

I.

The characteristics that have been given as differentiating the genera *Psychrolutes* and *Neophrynichthys* probably do not exist in nature. As Professors Jordan and Gilbert have shown, a spinous dorsal is really developed in their *Psychrolutes;* there is a spinous dorsal of short, slender flexible spines imbedded in the skin and scarcely visible. There are eight of these spines. On the other hand, the distinctness of the spinous dorsal in *Neophrynichthys* has been exaggerated. In that genus the spinous dorsal is obscure, externally, as in *Psychrolutes*, and it is only when the skin is upraised that the spines can be seen and enumerated. There is in this respect probably no difference between the typical *Psychrolutes* and *Neophrynichthys*.

In fact, the two genera appear to be nearly related, but the relations of neither are with the Gobiescoidæ or any other form to which Dr. Günther has approximated them. Nevertheless, the genus *Neophrynichthys* manifests a decided general resemblance to a Batrachid both in physiognomy and the loose skin with which the body and fins are invested, and it is not at all surprising, and, indeed, quite natural, that a superficial observer who merely looked at the outside should be misled by the resemblance and refer the family next to the Batrachids. As has been already pointed out, however, it is with the *Cottidæ* alone that we have to compare them. If the skin is cut and lifted up from the cheek of *Neophrynichthys*, a distinct suborbital stay is revealed; that stay is undoubtedly, as in the case of *Cottidæ* generally, the enlarged third suborbital bone, and, likewise, as in the *Cottidæ*, it obliquely crosses the cheek and is attached to the inner angle or margin of the pre-opercnlum in the manner that is characteristic of those fishes. The genus *Neophrynichthys* and consequently also the genus *Psychrolutes* must be referred to the neighborhood of the *Cottidæ*. Whether the two genera really belong to that family can not be ascertained until an examination is made of the skeleton. It is quite possible that they may then prove to really represent a peculiar family. But in the mean time, while no characters of anything like family value are apparent, it is advisable to follow in the footsteps of Professors Jordan and Gilbert and associate them with the *Cottidæ*. In that family, however, we can isolate them in a distinct group or subfamily under the

name *Psychrolutinæ*. That subfamily will only include the two genera in question, *Cottunculus*, which has been referred to it by Professors Jordan and Gilbert, appearing to be more closely related to the typical *Cottidæ*. The superficial characters of the subfamily are given in the concluding synopsis.

II.

The generic differences between the genera *Psychrolutes* and *Neophrynichthys* can only be certainly ascertained when a typical *Psychrolutes* can be re examined.

III.

The relation of the fishes of New Zealand and South America, considered to be conspecific by Dr. Günther, remains for consideration.

The *Neophrynichthys latus*, as described by Captain Hutton, Mr. W. Arthur, and Dr. Günther, is a fish about 7 inches long, exceptionally attaining a length of 9 inches; it has no conspicuous tentacles; its color is noticeable for the distinct roundish or oval spots which cover the body and head, and extend more or less upon the fins. (The color is noticed more at length in the specific diagnosis.) The species is quite uniform in respect to coloration, as Hutton, Günther, and Arthur essentially agree respecting it, and other descriptions are corroborated by the specimen under examination. Inasmuch as the specimens which Dr. Günther and the present writer have observed are derived from New Zealand naturalists,* it is presumable that there is no essential difference between them and any of the others that have been found. Consequently, the color may be said to be generalized from about a dozen individuals at least. The South American fish referred to *Neophrynichthys latus* is, however, very different. A single specimen obtained during the survey of H. M. S. *Alert*, in Swallow Bay, Magellan's Straits, is 16 inches long. The coloration is a blackish-brown, marbled with a lighter brown and gray; small branched tentacles are represented as being developed above on each side of the snout and along the roofs of the orbits, as well as in a row along the preoperculum and scattered over the body.

According to Dr. Günther, these differences are not enough to indicate specific distinctness. In our own opinion they are amply sufficient to indicate such differences, especially in view of the uniformity in size, coloration, and absence of tentacles which distinguishes the *Neophrynichthys latus* of New Zealand. In addition to the differences alluded to by Dr. Günther, if we can place any reliance on the plate accompanying that gentleman's communication, the South American fish dif-

* The specimen in the U. S. National Museum was sent by Professor Parker, of Otago, who has made several excellent contributions to our knowledge of New Zealand fishes.

fers very much from the New Zealand one in the contour of the head, size of the eyes, the distinctness of the spinous dorsal, and the development and form of the soft dorsal, anal, and caudal fins, as well as of the pectoral. In a fish of this type, in which the skin so loosely invests the body and head, wide difference in form may be assumed, but it is scarcely likely that the artist should have so misrepresented such a fish as *Psychrolutes latus* as would be the case if the figure published by Dr. Günther is correct. A simple comparison between the figure in Dr. Gunther's communication and that of the New Zealand fish herein given will serve to show the differences; the accompanying figure has been very carefully drawn from the fish placed in natural position, and it will be found difficult to believe that there is a specific identity of that fish and the one illustrated by Dr. Günther. We have, therefore, no hesitation in differentiating the South American from the New Zealand fish and in giving to it a new name. The question for further investigation will be, in fact, rather whether the two fishes do not belong to different genera.

IV.

The results thus detailed may be summed up in the following synopsis, briefly recapitulating the characteristics of the subfamily *Psychrolutinæ*, and the species *Neophrynichthys*. We may hope that perhaps Professor Parker, to whom we are indebted for excellent memoirs on the anatomy of several fishes of his adopted home, may give himself, or depute a student to give us, some details as to the anatomy of a fish which does not appear to be excessively rare in New Zealand.

Subfamily Psychrolutinæ.

Cottidæ with ventral fins thoracic, rather close together, and each rising from a pocket-like fold of the skin, little developed, and composed of one spine very feebly developed, and one or more rays; with a spinous dorsal little developed and more or less continuous with the soft; the spines slender; the head and the entire body invested in a loose skin, which conceals all cephalic prominences and encroaches on the fins, almost entirely concealing the spinous dorsal and enveloping the soft vertical fins nearly to the tips of the rays; the branchial apertures confined to the sides and separated by a very wide isthmus, formed by the continuous skin between the chin and the abdomen.

PSYCHROLUTES.

Psychrolutes paradoxus.

Psychrolutes paradoxus Günther, Cat. Fishes, B. M., vol. 3, p. 516, 1861.

Psychrolutes of a dusky color, pale below, about 2 inches long.

Habitat.—Pacific coast, North America (Kodiak; Gulf of Georgia).